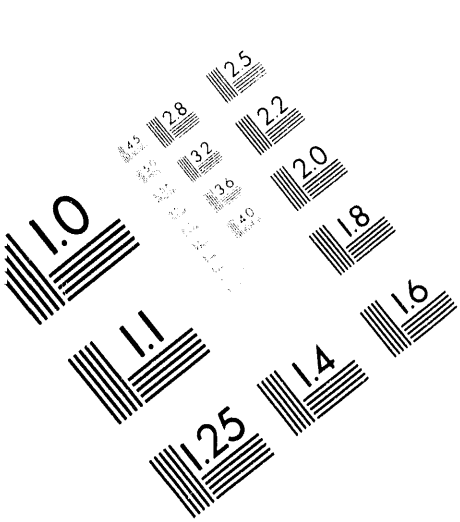

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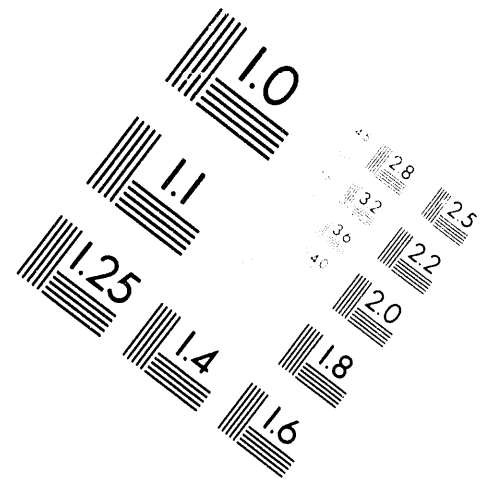

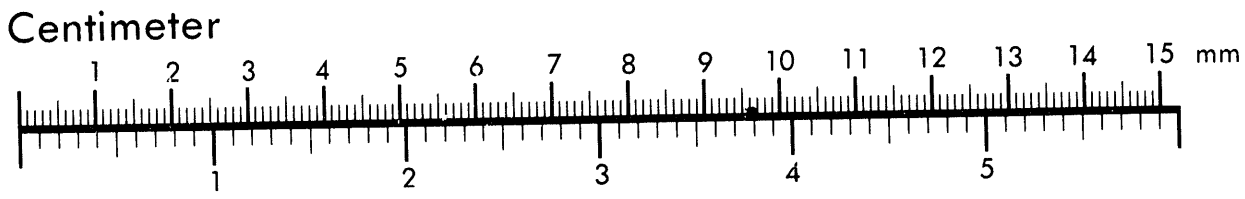

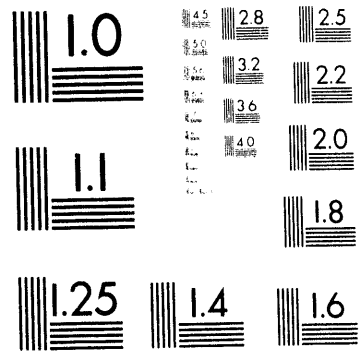

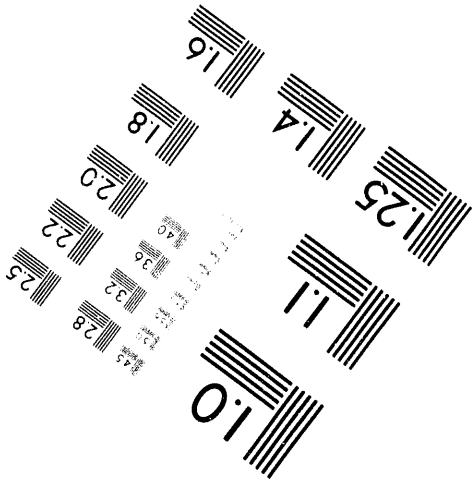

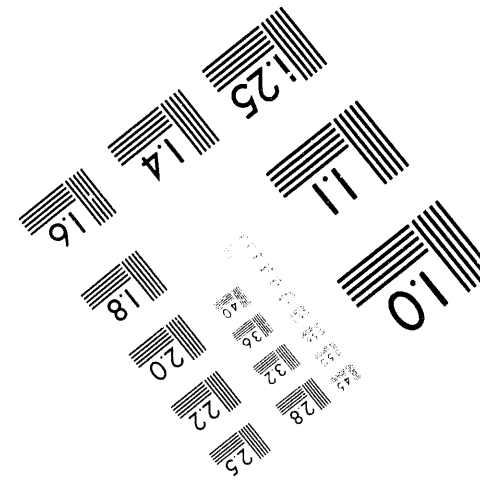

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A TEAM LEADERSHIP APPROACH TO MANAGING THE TRANSITION FROM CONSTRUCTION TO OPERATIONS FOR AN ENVIRONMENTAL PROJECT

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INTRODUCTION

This presentation describes a team approach, at the total-project level that focused team members with common objectives, for the transition to start-up and operation of the project. The Integrated Management Team (IMT) approach has been successful for this U.S. Department of Energy (DOE) environmental restoration project at the Hanford Site in Richland, Washington. The $53.8-million project will collect, treat, and dispose of low-level mixed waste water discharges from the Hanford Site. Construction is scheduled for completion in September 1994 and facility start-up in June 1995. The project challenge is for leadership that is committed to the transition from construction to operation of the environmental restoration project.

BACKGROUND

From World War II through the end of the Cold War, the Hanford Site in southeastern Washington State secretly produced much of the plutonium in the United States used for defense weapons. As a result of the defense effort, Hanford's production facilities generated a large amount of radioactive and hazardous waste between 1943 and 1989. Because plutonium production was top priority and environmental abuses were less understood, this waste was managed or disposed of in ways that would not meet today's standards. Since production ended in 1989, Hanford's mission has been to identify and solve the complex problems posed by all this waste. These problems threaten not only the environment, but also the safety of people both onsite and offsite.

Solving such massive problems will take a great deal of time and money. The *Hanford Federal Facility Agreement and Consent Order*[1] (Tri-Party Agreement) signed by DOE, the U.S. Environmental Protection Agency (EPA), and the Washington State Department of Ecology (Ecology) in 1989 and revised in 1994, lays out a 40-year schedule. The Hanford Environmental Compliance (HEC) Project, started in 1989 and scheduled for completion in 1995, is a cornerstone of the Hanford cleanup effort to meet the Tri-Party Agreement. The HEC Project was established to monitor Hanford Site operations to ensure that environmental requirements are met, to modify specific facilities at Hanford to attain environmental compliance, and to mitigate environmental consequences of current operations.

The Effluent Treatment Facility (ETF) Project was established to meet a HEC Project objective and Tri-Party Agreement milestone to add and enhance capabilities for treatment, storage, and disposal of waste water at the Hanford Site.

Procurement strategies were established during front-end planning of the ETF project. These strategies included a prime fixed-price design construction contractor for the 40,000-ft^2 ETF and onsite design for the utilities, collection, and disposal portions of the project.

The project provides a new treatment facility and office building. The ETF will treat the collected process condensate from the 242-A Evaporator and use "Best Available Technology" to permit land disposal of the treated effluent. The treatment process (Figure 1) includes a combination of filtration, ultraviolet oxidation, reverse osmosis, and ion exchange. Secondary wastes will be concentrated with evaporation and drying and placed in drums in preparation for disposal.

The Hanford Site ETF processes mixed waste water coming from Hanford Site processes. The processed waste streams are process distillate discharge (40 gal/min), ammonia scrubber distillate (35 gal/min), process condensate (75 gal/min), and waste water from the Liquid Effluent Retention Facility (150 gal/min). These low-activity radioactive waste water streams contain small amounts of ammonia, inorganics, organics, and particulates, for a total process capability of 150 gal/min.

The ETF will reduce the level of contamination in the water to a level that is less than that required by Westinghouse Hanford Company (WHC), DOE, and Washington State. To accomplish this, the ETF process uses eight proven technologies, as shown in Figure 1. The fixed-price design construction contractor pre-qualified each process for its application in the ETF. In addition to water that can be released to the environment, the only other product from the ETF is a small quantity of packaged dry powder waste. The ETF project performance is a result of coordinated efforts by the ETF IMT and the creative application of proven process technologies.[2]

LEADERSHIP THROUGH TRANSITION

The DOE Undersecretary has delegated the responsibility for approval of mission need and principal management activities to the Acquisition Executive. Program responsibilities rest with the Assistant Secretary of the Office of Environmental Restoration and Waste Management (EM-1). The HEC Project management approach follows the principle of decentralization of program and project activities to the DOE operations office. The DOE, Richland Operations Office (RL) is responsible for the management of the HEC Project with appropriate levels of DOE-Headquarters (HQ) oversight. The IMT leadership reports through the HEC Project Organization.

The RL will provide overall coordination of project activities through the Hanford Operations, WHC, and Engineering Contractor, ICF KH. ICF KH will provide, as appropriate, Architect-Engineering services, force account construction, and construction management.

The complexity of the ETF required a unique relationship to be established for implementation. Under the direction of the DOE, WHC, and ICF Kaiser Hanford Company (ICF KH) joined organizationally to form the IMT. This teaming allowed the most qualified organizations to perform various aspects of the project. Leadership and control have been distributed through the IMT. Daily actions converge easily through the IMT as the primary project leadership. The IMT has provided front-end planning, which has enabled the successful completion of design and construction phases of the project. Figure 2 shows the design, construction, and startup schedule. The start-up challenge was for the IMT and the prime contractor to implement successful operation of the treatment facility.

The traditional interpretation of project success is completion within the constraints of scope, time, and cost. "Today, the definition of project success has been modified to include completion:

- Within the allocated time period.
- Within the budgeted cost.
- At the proper performance or specification level.
- And acceptance by the customer/user.
- With minimum or mutually agreed upon scope changes.
- Without disturbing the main work flow of the organization.
- Without changing the corporate culture."[3]

The IMT has had to provide leadership at all levels for these pertinent items to successfully complete this project. The term "acceptance by the customer/user" will be discussed under Operation Readiness. Schedule, cost, and performance specifications evolved significantly throughout the project life. The following is a summary of these changes.

- In 1989, the project was validated by the DOE with a schedule of 1991 through 1993 at a cost of $11 million with a performance level of two waste streams at 75 gal/min.

- In 1990, the project was revalidated by the DOE with a new schedule of 1990 through 1993 at a cost of $52 million. The revalidation was based on a DOE program change that combined two projects, which resulted in a performance-level increase to three waste streams at 150 gal/min.

- In 1991, a project change was made with the schedule of 1990 through 1994 at a cost of $52 million, which added delays from development of the fixed-price design construction specification.

- In 1993, a program change was made with a new schedule of 1990 through 1995 at a cost of $53 million, which added a new specification for an 9,000-ft^2 office support building. The support building provides space for engineering and management personnel associated with the ETF.

These four significant changes evolved from the DOE, Programs, and Projects, and were known both vertically at the management level and horizontally in the IMT. The changes affected mutual understanding and the willingness to make concessions and tradeoffs. This disruption caused by change has seriously stretched project morale at times, but the IMT continued to focus on the operational success of the ETF. As Dr. Kerzner defines project success, the IMT has gained mutual agreement on scope changes, maintained the organizational work flow, and functioned within the corporate and government culture.

The project structure, as integrated into the IMT, was supported and approved by WHC and ICF KH management. "There are always class or prestige gaps between various levels of management. There are also functional gaps between working units of the organization. If we superimpose the management gaps on top of the function gaps, we find that companies are made up of small operational islands that refuse to communicate with one another for fear that giving up information may strengthen their opponent's. The project manager's responsibility is to get these islands to communicate cross-functionally toward common goals and objectives."[4] The IMT has had to manage through the dilemma Dr. Kerzner has identified. The islands have crossed between company and contract relationships. As the IMT transitioned to start-up the communication gaps were reduced as the IMT focused on start-up as a common goal.

TRANSITION TO START-UP

The leadership challenge now was to manage the project during its transition to start-up and operations. As established in the front-end planning, the IMT and the prime fixed-price design/construction contractor would be responsible for implementing project start-up. Start-up activities include a final review of logic diagrams, vendor information, and operation and control manuals. Assimilation of this information from the contractor by the operations staff was a key element and proceeded through the following activities:

- Factory inspections and test
- Site alignment tests
- Acceptance Test Procedures (ATP)
- Operational test
- Certification training of plant operators.

Factory inspections and test were performed during fabrication/procurement of major equipment and construction activities, respectively, for vendors and subcontractors. The site alignments and ATP verifications determined facility readiness through actual pretesting and functional testing that verified by demonstration that the ETF performed to specification requirements.

The assimilation of this information for the operation staff started during the factory and site alignment tests. Operations witnessed the factory test along with the contractors test engineers. This enabled operations to relate the physical equipment to the design and specifications as it fit into the overall ETF configuration. The sight alignment test provided the opportunity to observe the piping, electrical, and instrumentation installations to the equipment for initial alignment of the systems.

The operational staffing was evaluated during this phase. Facility startup involves an activity level that requires staffing above the levels necessary to operate the facility. This evaluation established the staffing requirements for operations. Additional resources would be supplied by the contractor to support the operational test and readiness. The resource requirements were determined as the project plan was implemented between WHC and ICF KH. The change in staff levels changed during the various project phases. The IMT challenge was to identify the peak needs where resources could best be used in terms of activities and skills.

ACCEPTANCE TEST PLANNING

A key element was the resource loading and planning for the ATPs. Eight teams were responsible for implementing the ATPs, which ensured each of the twenty-eight systems operate as intended. The leadership challenge in managing the successful completion of the ATPs within the scheduled 3-month period was paramount in ensuring that the teams performed accurately the first time.

The contractors resource loading in planning of the ATP was established among these eight teams. The teams were functionally organized with a team leader, electrical operator, mechanical operator, instrument and control engineer, controller, and a problem resolution engineer.

The controller provided the "permit to work" for the ATP and maintained configuration control of the ATP. Also, an engineer was dedicated to resolve questions and problems for the ATP team and issue the document change for resolution.

Seventy ATPs were issued for the twenty-eight systems. The systems were divided into three groups to be implemented by the eight teams during a three-shift schedule. The schedule comprised of a day shift, first shift, and second shift. The day shift, 10:00 a.m. to 7:00 p.m., provided overall management and general engineering support. The first shift, 5:00 a.m. to 2:00 p.m., and second shift, 1:00 p.m. to 10:00 p.m., provided for the actual hands-on mechanical and operational functions for each ATP. The overlapping shifts enabled the teams to work in an organized and coordinated manner while progress and problem resolution was maintained on the day shift. The WHC operations staff observed the actual ATP for the transition to operational readiness.

OPERATION READINESS

A readiness review plan will be followed to ensure that the facility stays within the safety envelope during start-up testing. The operation readiness will include equipment verification, configuration control, and project turnover. The transition to operations will be sequenced to maintain system configuration control from the official acceptance of construction.

The contractor provided the initial operations training program to supply operations with a effective and auditable foundation. The contractor, being responsible for the design and start-up, was well suited to improve efficiency and communications with the operations staff. Provisional training procedures and observations during acceptance testing certified plant operators for operational tests.

LEADERSHIP ASSESSMENTS

The operational readiness for the ETF was of concern by the IMT management in March 1994. Three assessments were completed through the IMT with the goal of continued successful completion of the project. The ETF contractor, WHC project, and WHC operations workshop provided a summary plan to achieve the successful transition of the ETF to start-up.

The conclusion of these assessments enabled the IMT to refocus on the need for increased communications at the senior-management level to clarify and close issues, optimize the team performance to achieve startup within budget, and meet the Tri-Party Agreement milestone.

ENVIRONMENTAL READINESS

Environmental permits that affect the project include: air permits, *Resource Conservation and Recovery Act of 1976*[5] (RCRA) permits, Washington Administrative Code 216 certification, and a delisting petition. The IMT has implemented the required documentation for environmental compliance.

In 1992, the project team was concerned as to its ability to process the appropriate environmental permits in a timely manner to support the projects schedule.

"To expeditiously proceed with the ETF, it was essential that WHC implement a permitting plan and discuss with the regulatory agencies the plan to allow agency planning, with respect to application and document review."[6] The permit plan has worked well in establishing a high-level outline for both the government and the regulatory agencies to follow. An implementing schedule was developed, see Figure 2 for RCRA, air, and water permit schedule. The schedule identified the key permits to the project milestones.

The permit process has succeeded because of the vigilance by WHC and DOE staff interfacing with the various agencies. Both formal and informal lines of communication has kept a positive focus as the permits and project progressed through their various phases. A full-time Ecology inspector was located at the ETF site to provide continual oversight during the construction activities. Ecology was an active participant and provided real-time input to the agencies and the IMT.

The plan addressed the permit requirements at the following levels: federal, EPA; state, Ecology; and county, Franklin County and Walla Walla County Air Pollution Control Authority (APCA). The permit application steps were integrated into the appropriate project schedule milestones.

The plan also addressed the agency relationship to the required permits. Air sources emissions, waste water discharge, and the dangerous waste delisting petition were constraining permit areas for the ETF. The readiness of the permits is as follows.

Air Source Emissions Permits for the ETF have been received and include the following: Controls for New Sources of Toxic Air Pollutants, Washington Administrative Code (WAC) 173-460, from Ecology; Radiation Protection-Air Emissions, WAC 246-247, from the State of Washington Department of Health; and National Emission Standards for Hazardous Pollutants, 40 CFR Part 61, from the EPA.

Waste Water Discharge Permit was submitted and is undergoing a completeness review by Ecology. EPA and Ecology discussed and coordinated the conditions for the 216 Permit Application and the Delisting Petition. The permit and petition will list the constituents to be monitored in the groundwater wells at the disposal site and in the verification tanks. Three wells were drilled at the disposal site in support of the 216 Permit Application. Data was collected at the wells for establishment of a pre-operational baseline. The list of constituents under negotiation with Ecology and EPA will be finalized after the sampling events. The wells and the monitoring followed standards set by RCRA.

Delisting Petition was submitted to EPA Headquarters fulfilling consent order requirements. EPA completed its in-department review of the Delisting Petition and finalized its proposed delisting levels based on modeling data. The Office of General Counsel provided a review before the petition was published in the Federal Register. A 45-day public comment period followed before final publication.

CONCLUSION

In summary, the IMT has brought together DOE contractors on the Hanford Site in a leadership approach to project planning that has facilitated a successful project. Management of the transition from the construction to operations phase of the ETF can only be evaluated in the years to come with successful operational campaigns.

The diligence of the IMT, DOE, and contractors as a leadership team has led to the successful transition of the project through start-up. While assessments and optimization have been painful, team members continued to focus on a total-project level with common objectives, providing a beneficial and cost effective project.

The leadership strategies have brought together the DOE contractor to enable team members to be flexible and dynamic, creating a new approach at Hanford for the transition to startup and operating.

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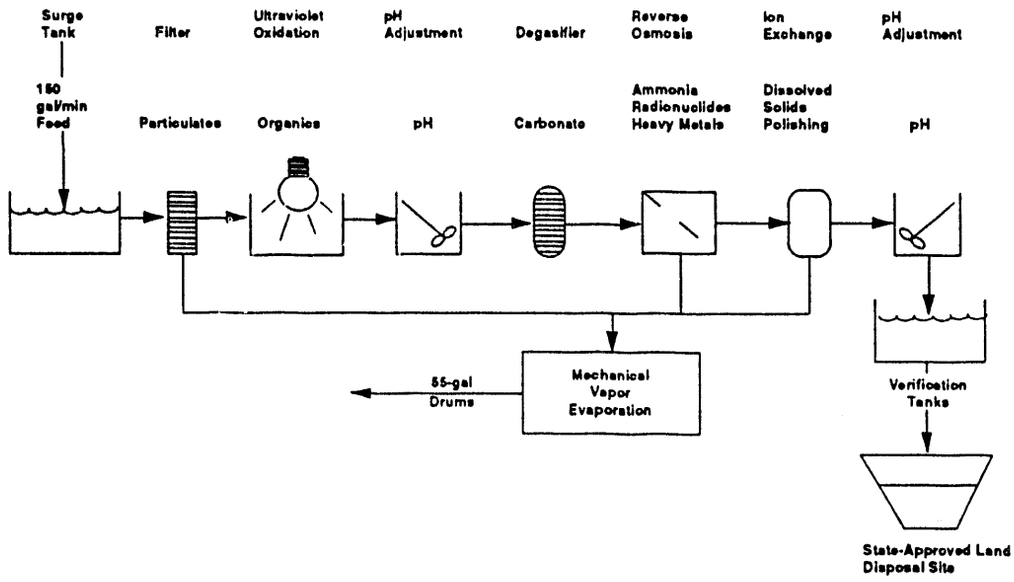
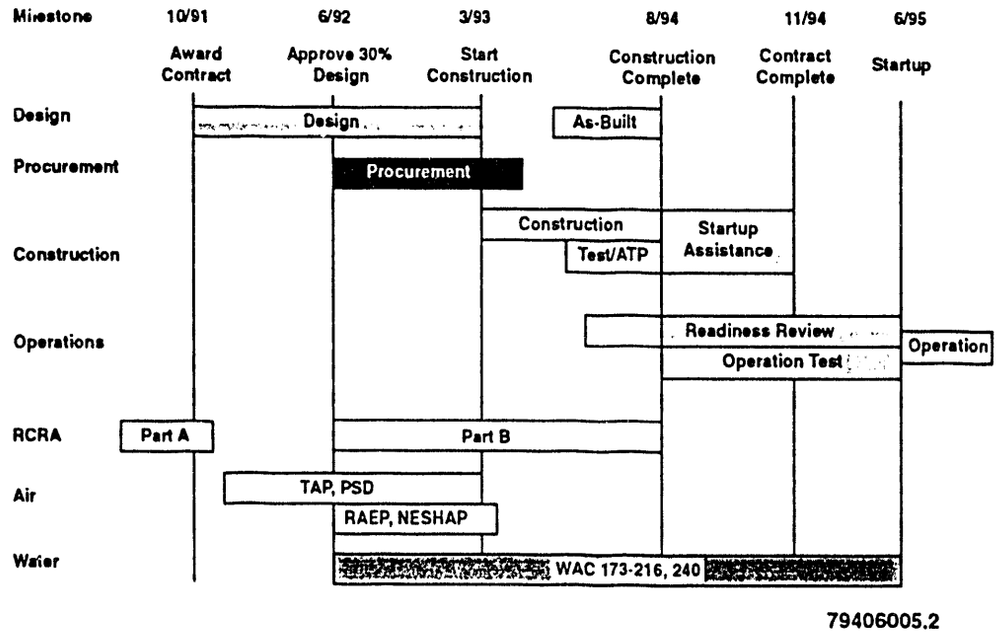


Figure 1. Treatment Process.



ATP = Acceptance Test Procedure
RCRA = Resource Conservation Recovery Act of 1976
TAP = Toxic Air Pollutants
PSD = Prevention of Significant Deterioration
RAEP = Radiological Airborne Emissions Program Approval
NESHAP = National Emissions Standards for Hazardous Air Pollutants
WAC = Washington (State) Administrative Code

Figure 2. Design, Construction, and Startup Schedule.

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